Particles of stone build up the mountains, and these, again, break down into stones and sand. But on this live the plants, each springing from a tiny seed, and growing from mould, with a little water and air, to such a wonder-work as all the artists of the world cannot rival. They bloom and seed and perish, but meanwhile they shelter and give food to all kinds of animals. And the animals, they too spring each from a little seed; and earth, air, and water are compounded to form that masterpiece which every animal is. Yet the animals feed, not on mould, but on the plants; and all animals in their turn serve the needs, the nourishment, or the pleasure of mankind. And so comes the conclusion: all is fashioned for the sake of man. Earth, herb, beast, and man; further the metamorphosis cannot go. But why is this great world created for man? Is not he, too, a thing of naught? What mighty attributes has he? This, this is his peculiar property: that not only can he see, hear, smell, taste, feel things, but that he can also contemplate the marvellous construction of all natural bodies, fathom their peculiar qualities, and reason therefrom to their high and skilful Master.

Love of life forces every creature to seek the necessaries of life. Man goes out with the rest, and so he must note and admire the work of the Creator. Some rich men, indeed, with all needs ready supplied, are little better than savages who sit in the sun and let fruit drop into their mouths; but the poor, who must earn food with toil and sweat, learn better to thank God therefor.

The true inquirer into nature's works must observe with accurate attention, seek out origins, follow generation and growth, unravel use and harm, and finally note change and decay. He looks not on the rowan-berry with the eyes of the raven, tastes not the herbs with the tongue of an ox, nor sports with doves after the manner of the hawk. Not hastily, not upon one or even upon many journeys, but ceaselessly and diligently must the inquirer mark and ponder on the natures and causes of things, on their relations both to themselves and to their surroundings, seeing that no natural thing lives or dies to itself alone.

Some object that natural history is but a heap of useless names. True, to know a heap of names and nothing more is no learning. But it were as easy to become a scholar without the alphabet, as a naturalist without names. Describe me a thing precisely as you will, I can make no use of it without a name; only by names can such knowledge be passed on, since the object cannot always accompany the description. Names are the alphabet of natural knowledge; and that is a true science, one that should be taught in all schools for the sake of its practical service to our country. . . .

Throughout the course the points here emphasised find abundant illustration, and often throw a curious light on the customs, the rural economy, the medicine, and the philosophy of the day. It would have been easy to pick out some delicious plums, but it seemed better to give, so far as might be in the words of Linnæus himself, the principles that guided him, and may still inspire us, in the illimitable study of nature.

F. A. B.

NOTES.

A GIFT of 20,000*l*. has been promised to London Hospital by Mrs. E. S. Paterson for cardiac research work.

ONCE again the Arctic claims its toll. The *Times* correspondent at Petrograd (St. Petersburg) reports that Lieut. Sedoff, the leader of a Russian attempt on the north pole, was taken ill at Hooker Island, Franz Josef Land, in September, 1913. The party was in dire straits in winter quarters, as the coal was all burnt and even parts of the ship were used for fuel. During February, 1914, a dash was made polewards; but, in March, Lieut. Sedoff, who had not recovered from his illness, died between Franz Josef Land and Rudolf Island. He had set out accompanied by two sailors and twenty-four dogs. The sailors buried the body, abandoned the dogs, and returned. The *Foka,* Sedoff's ship, had previously, in August, 1913, been useful in the rescue of two members of the Brousiloff Expedition. M. Brousiloff, with half the expedition, is reported still in his ship, the *St. Anna,* hoping that the current will carry the ship north of Spitsbergen, so that he can break through southwards. In consequence of the privations they had endured on the voyage from the Kara Sea, eleven members of the expedition left the ship; of these all perished but the two rescued by the *Foka.*

THE Board of Agriculture and Fisheries has received the following from the Agricultural Consultative Committee:—Milk-sellers or others who have a surplus of milk to dispose of are strongly urged to take steps to have it converted into cheese either in their own dairies or cooperatively. This method of dealing with surplus milk beyond what is required for immediate consumption will not only be found more remunerative than separating the milk and making the cream into butter, but will also be a useful means of contributing to the conservation of the food supply of the nation. The types of cheeses most suitable for manufacture in the circumstances are Cheddar, Cheshire, Derby, Leicester, and Gloucester, or such other varieties as do not deteriorate under reasonably prolonged storage.

IN the medical papers and in the *Times* the value of, and necessity for, anti-typhoid vaccination for all branches of the Army have been urged by Sir William Osler, Sir Lauder Brunton, and Sir William Leishman. Figures quoted by Sir William Leishman are eloquent as to the efficiency of the vaccination for the prevention of typhoid fever: in India, where formerly this disease among the British garrison cost us from 300–600 deaths annually, was last year responsible for fewer than twenty deaths, 93 per cent. of the men now being inoculated. Large supplies of the vaccine have been prepared at the Royal Army Medical College, while the department for therapeutic inoculation, St. Mary's Hospital, Paddington, has furnished nearly

280,000 doses of the vaccine for the use of the Army. Sir Almroth Wright, the author of anti-typhoid inoculation, points out in the *Times* that it is already compulsory in the French and American Armies, and he urges that it should now be made so also in the British Army. He states also that 180,000 doses of an "anti-sepsis" vaccine have been supplied to our Army and Navy, and also to the French military hospitals during the past three weeks. It is believed that this vaccine will be of great value in protecting our Army from bacterial infection of wounds.

A SUMMARY of the weather for the past summer as comprised in the thirteen weeks ending August 29 has been given by the Meteorological Office for all districts of the United Kingdom. The mean temperature for the summer is above the average in all parts of the British Isles. The excess is greatest in the north of Scotland and in the north and north-east of England, where it amounts to about 1·5°, and in the east and west of Scotland, the midland counties, and the north-west of England the excess is 1°. In the Channel Islands the excess of temperature is very trifling. The south-east of England is the only district in which the highest temperature has reached 90°. The aggregate rainfall for the summer varies considerably in different districts of the United Kingdom. The highest excess of the summer fall is 125 per cent. of the average in the south-west of England, in the north-east of England, and in the midland counties the fall is 112 per cent. of the average, and the Channel Islands is the only other district with an excess, with 107 per cent. of the average. In the north of Scotland the rainfall is only 71 per cent. of the average, and 78 per cent. in the west of Scotland and in the east of England. In the south-east of England the summer fall is 88 per cent. of the average. The duration of bright sunshine is generally in excess of the average.

PROF. O. SCHLAGINHAUFEN reviews the pygmy question in New Guinea in the *Festschrift der Dozenten der Universität Zürich*, 1914, and in Melanesia in the *Arch. Suisses d'Anthrop., Geneva.* 1914. He comes to the conclusion that in Melanesia we know of only one group which can be called pure pygmy, the Tapiro of West Netherlands, New Guinea, with a mean stature of 144·9 cm., described by Wollaston and Rawling. Then come four tribes, the Kamaweka of the Mekeo district, British New Guinea, noted by Seligmann, the Goliath group of Netherlands New Guinea, described by van den Broek, the Torricelli group, and Kai of German New Guinea, described by himself and Pöch respectively, all with a mean somewhere about 150 cm. These are often regarded as a mixture between true pygmies and tall varieties, but there is no proof of this. These five tribes inhabit the hilly interior. For all groups studied in New Guinea the general rule holds good that stature increases from inland to the coast, and the cephalic index (with some exceptions) decreases. The author holds that this association points to these being less racial characters than functions of geographical control. Dolichocephalism combined with low stature has not yet been observed in New Guinea or the Bismarck Archipelago. No distinct group of pygmies have been found as yet in the Bismarck Archipelago or the Solomon Islands, though very short people occur sporadically. The author gives an interesting coloured map showing the distributions of stature in New Guinea and the Bismarck Archipelago.

AN illustrated account of a sixteenth-century building at West Hoathly, Sussex, known as the Priest House, which has been restored and fitted up as a museum by Mr. Godwin King, appears in the *Museums Journal* for September. Admirable as is the restoration, it would have been better if the interior had been refitted according to the original plan. This, it is suggested, may, however, be indicated in a miniature model of the building.

IN his presidential address at the annual meeting of the new Zealand Institute (Proc., vol. xlvi.), Dr. C. Chilton paid a well-deserved tribute to the services rendered by the late Augustus Hamilton to that body, and also to the Dominion Museum, of which he was director. In a later part of the address the president directed attention to the unsatisfactory housing of the valuable specimens and the library of the Institute in the Dominion Museum. The majority of the specimens in portions of the collection—especially the examples of Maori workmanship and art—are irreplaceable, "yet they are still housed in a wooden building that is almost falling to pieces through age, and the greater part of which has been declared to be insanitary for human beings."

IN vol. iii., part 3, of Records of the W. Australian Museum, Mr. L. Glauert gives an account of new discoveries of mammalian remains in the so-called mammoth cave. The most interesting of these pertain to a big echidna, believed to have been double the size of the living Australian *Echidna aculeata*, and also exceeding in size any of the previously described extinct forms, one of which has been referred to the genus Zaglossus, or Proechidna, now confined to New Guinea. The new specimens are, however, considered to represent a still larger species, for which the name *Zaglossus hacketti* is proposed. In recording remains of the Tasmanian wolf and Tasmanian devil from the same cavern, Mr. Glauert incidentally mentions that an apparently wild individual of the latter species was killed near Melbourne in 1912.

IN an admirably thought-out article on the osteology of Permian reptiles, in No. 8 of vol. i. of Contributions from Walker Museum, published in this country by the Cambridge University Press, as agents for the University of Chicago Press, Mr. S. W. Williston gives certain very cogent reasons for deposing the New Zealand tuatera (Sphenodon) from its hitherto undisputed position as one of the most primitive reptiles with which we are acquainted. As the result of an elaborate study of the skeleton of the lizard-like Aræoscelis from the Permian of Texas, the author has come to the conclusion that in the earliest reptiles it is much more probable that the bony skull-roof inherited from the stegocephalian amphibians should have been perforated only once, rather than twice, on each side, and consequently that the two bony temporal arcades of the tuatera represent a more specialised type than does the single one of lizards. And when once the matter is put before us in this straightforward manner, we can scarcely refrain from wondering why we never thought of it before. Araeoscelis, in which there is certainly but a single arcade, is regarded by the author as the typical representative of a group—Araeoscelidia—which shall include the European Permian genera, Protorosaurus and Kadaliosaurus, and the position of which should be next the Squamata (lizards and snakes). Ichthyosaurs, which never possessed a lower temporal vacuity, and are evidently a primitive group, are not improbably more or less nearly related to the Araeoscelida. Palaeohatteria, on the other hand, which has long been associated with the European representatives of the last-named group, is in every essential character near akin to the Pelycosauria, in which it should typify a special family.

MR. JAMES RITCHIE, of the Royal Scottish Museum, has published a short but interesting paper on the fauna of a deep coal-pit in Midlothian. None of the animals show any indication of bleaching or blindness, and it is evident that all must have been artificially introduced, to a great extent, with the timber used as props. The only springtail in the list is *Tomocerus minor,* a species that happens to be constantly found in caves, but none of the characteristic white, blind cave-insects of the order Collembola were discovered in the coal-pit.

THE valuable series of "L.M.B.C. Memoirs" published by the Liverpool Marine Biology Committee has reached No. xxii., in which Mr. Herbert C. Chadwick, of the Port Erin station, describes the Echinoderm larvae taken by tow-netting in the neighbouring waters. Most of the larvae described are ophiuroid or echinoid plutei, the young stages of asteroids and holothuroids being unexpectedly scarce. The memoir is illustrated with nine plates of excellent structural figures..

DR. G. K. GILBERT, with the aid of Mr. E. C. Murphy, has made a characteristically thoughtful study of "The Transportation of Débris by Running Water" (U.S. Geol. Survey, Professional Paper 86, 1914). Working with an experimental trough some 30 ft. in length, which could be adjusted at various slopes, and another trough, 150 ft. in length, which was kept horizontal, measurements were made of the quantity of material of known grade carried forward by traction on a bed built up of similar grains and moulded by the flow. Such a bed represents the conditions that occur in nature, and "the material of the load is derived from and returned to the bed," in contrast with movement in "flume transportation," where the artificial channel has a rigid floor. "Saltation," where a particle is caught in an ascending swirl and shot forward for a time freely above the bed, plays an important part in transportation; and a particle "in suspension" may be regarded as making a very long leap of this kind. The present work, which does full justice to the complex phenomena, is concerned with traction and not with suspension.

DETAILS of severe shocks in the earthquake belt extending from Sumatra to New Guinea and the Carolines are published (in Japanese) in the Journal of the Meteorological Society of Japan for July, 1914. Two such earthquakes have occurred so far this year, details of which were recorded at the Osaka Seismological Observatory as follows:—(1) April 12, at 1h. 39m. 41s. a.m.; preliminary tremor lasting 7m. 22s., principal shock, 6m. 0s.; maximum amplitude, E.–W. movement at 1h. 57m. 5s., 632 microns, period 20·2s.; S.–N. movement at 1h. 58m. 1s., 747 microns, period 21·6s.; total duration of shock, E.–W. 2h. 11m., S.–N. 2h. 14m.; located near Gilbert Island, east of New Guinea. (2) May 26, at 11h. 29m. 56s. p.m.; preliminary tremor lasting 5m. 53s., principal shock, 3m. 4s.; maximum amplitude, E.–W. movement at 11h. 47m. 8s., 2187· microns, period 23·0s.; S.–N. movement at 11h. 50m. 41s., 4305 microns, period 20·8s.; total duration of shock, E.–W., 3h. 29m., S.–N., 3h. 33m.; located near Celebes. Nine earthquakes of a similar or greater magnitude than the latter, it is noted, have occurred in the same region since 1907, the intervals separating them showing a gradual diminution in length.

IN the last report of the Meteorological Committee mention was made of the increase in the sale of the *Daily Weather Report,* which is due largely to subscriptions from schools; for some years past back copies have been supplied for educational purposes at the cost of postage. A notable case of the use that may be made of these charts and other Meteorological Office publications is explained by Mr. W. E. Whitehouse, assistant lecturer in physical geography at Aberystwyth University College, in a pamphlet entitled "Suggestions for a Course in Climatology in Correlation with Geography," by means of which "a vital section" of the latter can be more systematically treated. The large number of questions for pupils cover most of the ground included under modern meteorology, and a student who could satisfactorily reply to the majority of them might claim to be well equipped in meteorological science. A useful bibliography has also been prepared in graded sections for the use of teachers and others. The pamphlet is prefaced by a very interesting introduction by Dr. Shaw; while fully recognising the practical and educational utility of the suggestions, he thinks (as we do) that the author is "very liberal in his interpretation of the scope of the science of climatology."

IN connection with the Canadian National Exhibition which has been opened at Toronto, the Imperial Department of Agriculture for the West Indies has issued an illustrated handbook under the title, "The West Indies in Canada," showing the main features of the industrial and trade relations of the West Indies, the nature of recent agricultural developments, and a description of the principal products of the islands. From this handbook it appears that Citrus planting is being rapidly extended in British Guiana and St. Lucia, tea is being planted in Jamaica, and cigars are now exported from Jamaica in considerable quantity. An interesting minor product is papaw, a pleasant table fruit derived from *Carica papaya*, which is grown in Montserrat, and serves as a source of papain, a digestive ferment the demand for which is rapidly growing, especially in Canada, and the United States. The cultivation of rice is also being greatly developed in Trinidad and British Guiana.

In the April number of the *Astrophysical Journal* Dr. Wali-Mohammad, of Aligarh College, India, described the results of his investigation of the degree of complexity of the spectral lines of aluminium, bismuth, cadmium, chromium, cobalt, copper, lead, magnesium, manganese, silver, sodium, tin and tellurium. As source of light he used a Wehnelt tube in which the kathode consisted of a platinum foil covered with oxides of barium and calcium, and the anode of the metal to be investigated contained in a porcelain tube. A potential difference of 200 volts was maintained between the anode and the red hot kathode. The tube was water-cooled and the pressure within it less than 0·01 mm. of mercury. The light passed out of the tube through a glass window at the top and was received by a Hilger echelon grating of 35 plates. The spectra were photographed on a series of plates each suitable for a part of the spectrum. The author found that few of the metals possessed complex lines, and of those that did copper, lead, and manganese had lines of similar structure. In nearly all cases the structure shown by the echelon agreed with that found previously by crossed Lummer plates.

In the domain of electro-chemistry the greatest commercial developments recently have been in the utilisation of nitrogen from the atmosphere for the manufacture of nitrogen products. It is only since electrical power has been obtainable in large amount at exceptionally low cost that the operations have been carried out profitably on a commercial basis. Probably the most interesting of the processes for the fixation of atmospheric nitrogen is that in which calcium carbide is employed as the medium for the production of calcium cyanamide. We learn from *Engineering* for August 28 that the Odda works in Norway are now producing 85,000 tons of calcium carbide and 80,000 tons of calcium cyanamide per annum, a result due largely to the admirable mechanical appliances in use. The electric power available at Odda will soon be increased to 125,000 horse-power, and the carbide and cyanamide factories will be further enlarged. The Nitrogen Products and Carbide Company have acquired water-fall rights in Norway and Iceland which will enable a total of about one million horse-power to be generated—sufficient for the production of nearly two million tons of cyanamide per annum. It may be noted that the use of cyanamide as a fertiliser is increasing rapidly.

The Carnegie Institution of Washington has published the second volume of the "Guide to the Materials for American History, to 1783, in the Public Record Office of Great Britain." This part contains departmental and miscellaneous papers, and is by Prof. C. M. Andrews, Farnam professor of American history in Yale University. The scope of the work and the method of treatment were explained when attention was directed to the publication of the first volume. The new part runs to 427 pages, and deals with papers of the Admiralty, the Lord Chamberlain, Custom House, Treasury, War Office, High Court of Admiralty, and other departments.

OUR ASTRONOMICAL COLUMN.

Comet 1913*f* (Delavan).—The following short ephemeris gives the positions of Delavan's comet (1913*f*) for the current month:—

Greenwich Midnight.

	R. A. h. m. s.	Dec. °
September 8	9 8 35	+49 56
16	10 8 6	49 51
24	11 9 33	47 56

The comet is now in the constellation of Ursa Major, and is not far from the two third magnitude stars κ and ι. On clear nights it is a conspicuous object in the northern heavens, and is easily picked up from the rough chart given in this column for last week. It is gradually becoming brighter, but the occurrence of bright moonlight during the last week has made observations somewhat difficult.

The Recent Eclipse Expeditions.—Further news is to hand regarding some of the observers who went out to observe the total eclipse of the sun. The *Morning Post* of September 3 gives some information about the party from the Royal Observatory, Greenwich, through Mr. Hepburn. Mr. Hepburn accompanied this party as a volunteer assistant to Minsk, in Russia, and they observed the eclipse under satisfactory conditions. He left there on the Sunday after the eclipse, but while most of the plates exposed were then not developed, one that was developed showed the spectrum of the chromosphere. Mr. Hepburn arrived in England on September 1 *viâ* Finland, Norway, and the North Sea, and he expected the official members of the party to be home on about September 6. It is stated that the instruments will be sent to the Russian Imperial Observatory at Pulkovo, where Prof. Backlund, the director, has arranged to keep them pending a favourable opportunity to return them to Greenwich. Mr. R. C. Slater had arranged to go to Riga (Russia) to make his observations, and sent his instruments there direct. He found, according to the *Times* of August 31, that he was unable to cross the Baltic. Having with him only a 4-in. lens he rigged up a camera and made his observations at Strömsum, in Sweden. With this he was successful, and he is recorded to have brought back with him excellent photographs of the corona.

The Mirrors of the Helwan Khedivial Observatory.—Bulletin No. 12 of the Khedivial Observatory at Helwan is devoted to accounts of the photographic tests of the figures of the new and old thirty-inch mirrors by Messrs. Walter S. Adams and H. Knox-Shaw respectively. The new mirror, the gift of Mr. Astor, was figured by Mr. Ritchey at Pasadena, and the method of testing was that of Hartmann. In the first tests a small amount of astigmatism was indicated in the zones along the 0° and 90° diameters, but none along the 45° and 135° diameters, or, in other words, the figure of revolution of the mirror was fairly good. A comparison of the computed and observed values of the focal lengths of the zones showed that the central zones were still greatly undercorrected. Further work in the mirror by Mr. Ritchey has greatly improved it, and a second series of tests has indicated that the agreement of the